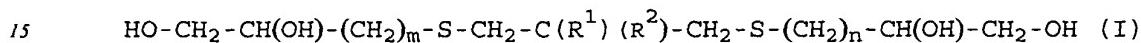
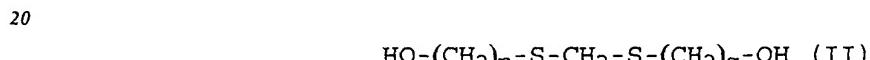


WE CLAIM:

1. A layer configuration on a support, said layer configuration comprising a layer containing a polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a compound selected from the group consisting of polyphosphoric acids, polyphosphoric acid salts, thia-alkanedicarboxylic acids, cyclohexadiene compounds and polyhydroxy-compounds selected from the group consisting of tetrone acid derivatives; ortho-dihydroxybenzene compounds with at least one sulpho group, compounds according to formula (I):

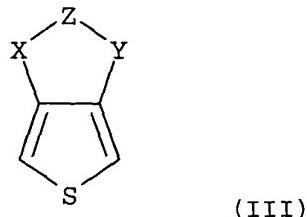


wherein R¹ and R² are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):



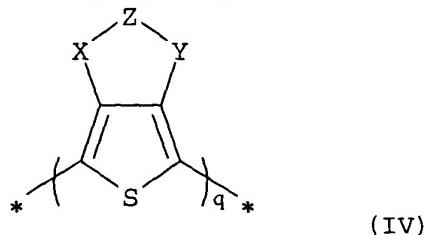
wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetrone acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulphony-substituted 2-thia-alkyl-benzimidazole compounds.

- 25 2. Layer configuration according to claim 1, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):



30 in which X and Y are O, Z is -(CH₂)_m-CR³R⁴-(CH₂)_n-; R³ is hydrogen or -(CH₂)_s-O-(CH₂)_p-SO₃⁻M⁺; R⁴ is -(CH₂)_s-O-(CH₂)_p-SO₃⁻M⁺; M⁺ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

3. Layer configuration according to claim 1, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



in which X and Y are O; Z is $-(CH_2)_m-CR^3R^4-(CH_2)_n-$; R^3 is hydrogen or $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; R^4 is $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

4. Layer configuration according to claim 1, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b][1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].

5. Layer configuration according to claim 1, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxy-thiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxy-thiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives and copolymers therewith.

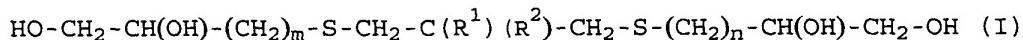
6. Layer configuration according to claim 1, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly(3,4-ethylenedioxythiophene).

7. Layer configuration according to claim 1, wherein said layer further contains a polyanion.

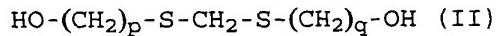
8. Layer configuration according to claim 7, wherein said polyanion is poly(styrene sulphonate).

9. A light emitting diode consisting of a layer configuration on a support, said layer configuration comprising a layer containing

5 a polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a compound selected from the group consisting of polyphosphoric acids, polyphosphoric acid salts, thia-alkanedicarboxylic acids, cyclohexadiene compounds and polyhydroxy-compounds selected from the group consisting of tetrone acid derivatives; ortho-dihydroxybenzene compounds with at least one sulpho group, 10 compounds according to formula (I):

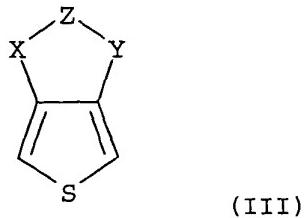


15 wherein R^1 and R^2 are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):



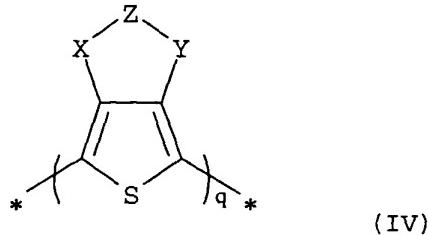
20 wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetrone acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulpho-substituted 2-thia-alkyl-benzimidazole compounds.

25 10. Light emitting diode according to claim 9, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):



30 35 in which X and Y are O, Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R^3 is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; R^4 is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

11. Light emitting diode according to claim 9, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



5 in which X and Y are O; Z is $-(CH_2)_m-CR^3R^4-(CH_2)_n-$; R^3 is hydrogen or $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; R^4 is $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

- 10 12. Light emitting diode according to claim 9, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b] [1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].

- 15 13. Light emitting diode according to claim 9, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxy-thiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxy-thiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives and copolymers therewith.

- 25 14. Light emitting diode according to claim 9, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly(3,4-ethylenedioxythiophene).

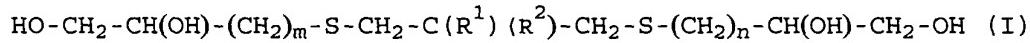
- 30 15. Light emitting diode according to claim 9, wherein said layer further contains a polyanion.

16. Light emitting diode according to claim 15, wherein said polyanion is poly(styrene sulphonate).

- 35 17. A photovoltaic device consisting of a layer configuration on a support, said layer configuration comprising a layer containing a polymer containing optionally substituted 3,4-

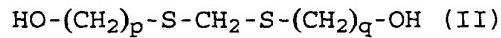
alkylenedioxythiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a compound selected from the group consisting of polyphosphoric acids, polyphosphoric acid salts, thia-alkanedicarboxylic acids, cyclohexadiene compounds and polyhydroxy-compounds selected from the group consisting of tetrone acid derivatives; ortho-dihydroxybenzene compounds with at least one sulfo group, compounds according to formula (I):

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wherein R^1 and R^2 are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):

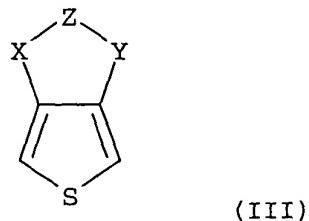


20

wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetrone acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulfo-substituted 2-thia-alkyl-benzimidazole compounds.

25

18. Photovoltaic device according to claim 17, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):

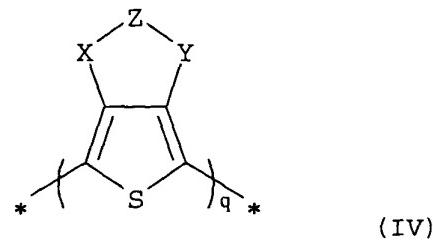


30

in which X and Y are O, Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R^3 is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; R^4 is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

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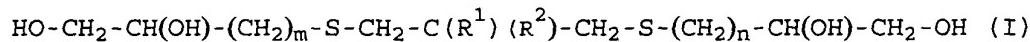
19. Photovoltaic device according to claim 17, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



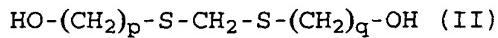
in which X and Y are O; Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R³ is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^- \text{M}^+$; R⁴ is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^- \text{M}^+$; M⁺ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

- 20. Photovoltaic device according to claim 17, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b][1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].
- 10 21. Photovoltaic device according to claim 17, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxy-thiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxy-thiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives and copolymers therewith.
- 15 22. Photovoltaic device according to claim 17, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly(3,4-ethylenedioxythiophene).
- 20 23. Photovoltaic device according to claim 17, wherein said layer further contains a polyanion.
- 25 24. Photovoltaic device according to claim 23, wherein said polyanion is poly(styrene sulphonate).
- 30 25. A solar cell consisting of a layer configuration on a support, said layer configuration comprising a layer containing a polymer containing optionally substituted 3,4-alkylenedioxy-thiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a compound selected

from the group consisting of polyphosphoric acids,
 polyphosphoric acid salts, thia-alkanedicarboxylic acids,
 cyclohexadiene compounds and polyhydroxy-compounds selected from
 the group consisting of tetrone acid derivatives; ortho-
 dihydroxybenzene compounds with at least one sulfo group,
 compounds according to formula (I):

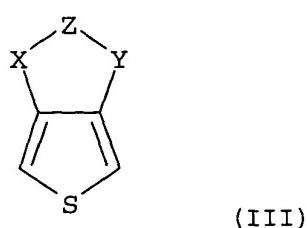


wherein R^1 and R^2 are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):



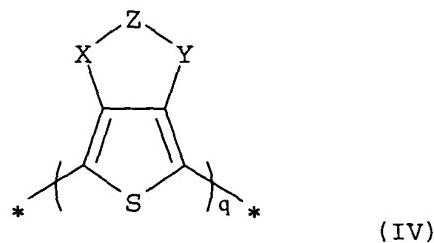
wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetrone acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulfo-substituted 2-thia-alkyl-benzimidazole compounds.

26. Solar cell according to claim 25, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):



in which X and Y are O, Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R^3 is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; R^4 is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

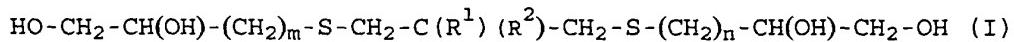
27. Solar cell according to claim 25, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



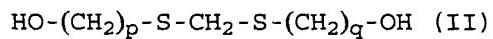
in which X and Y are O; Z is $-(CH_2)_m-CR^3R^4-(CH_2)_n-$; R³ is hydrogen or $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; R⁴ is $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; M⁺ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

- 28. Solar cell according to claim 25, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b][1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].
- 10 29. Solar cell according to claim 25, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxythiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxythiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives and copolymers therewith.
- 15 30. Solar cell according to claim 25, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly(3,4-ethylenedioxythiophene).
- 20 31. Solar cell according to claim 25, wherein said layer further contains a polyanion.
- 25 32. Solar cell according to claim 31, wherein said polyanion is poly(styrene sulphonate).
- 30 33. A transistor consisting of a layer configuration on a support, said layer configuration comprising a layer containing a polymer containing optionally substituted 3,4-alkylenedioxy-thiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a compound selected

from the group consisting of polyphosphoric acids,
 polyphosphoric acid salts, thia-alkanedicarboxylic acids,
 cyclohexadiene compounds and polyhydroxy-compounds selected from
 the group consisting of tetrone acid derivatives; ortho-
 dihydroxybenzene compounds with at least one sulfo group,
 compounds according to formula (I):

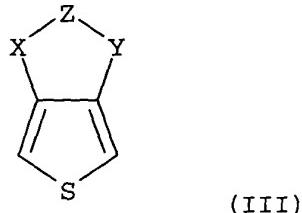


wherein R^1 and R^2 are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):



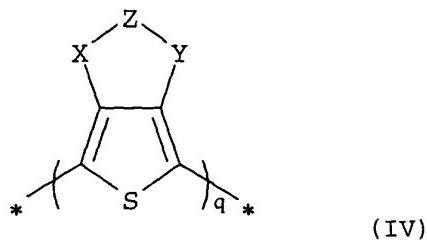
wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetrone acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulfo-substituted 2-thia-alkyl-benzimidazole compounds.

34. Transistor according to claim 33, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):



in which X and Y are O, Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R^3 is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^- \text{M}^+$; R^4 is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^- \text{M}^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

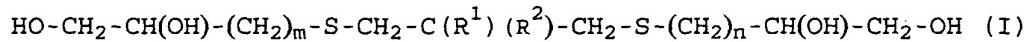
35. Transistor according to claim 33, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



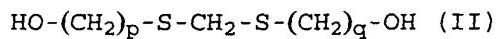
in which X and Y are O; Z is $-(CH_2)_m-CR^3R^4-(CH_2)_n-$; R³ is hydrogen or $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; R⁴ is $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; M⁺ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

- 36. Transistor according to claim 33, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b][1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].
- 37. Transistor according to claim 33, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxythiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxythiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives and copolymers therewith.
- 38. Transistor according to claim 33, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is poly(3,4-ethylenedioxythiophene).
- 39. Transistor according to claim 33, wherein said layer further contains a polyanion.
- 40. Transistor according to claim 39, wherein said polyanion is poly(styrene sulphonate).
- 41. An electroluminescent device consisting of a layer configuration on a support, said layer configuration comprising a layer containing a polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units, in which said two alkoxy groups may be the same or different or together represent an optionally substituted oxy-alkylene-oxy bridge, and a

compound selected from the group consisting of polyphosphoric acids, polyphosphoric acid salts, thia-alkanedicarboxylic acids, cyclohexadiene compounds and polyhydroxy-compounds selected from the group consisting of tetronic acid derivatives; ortho-dihydroxybenzene compounds with at least one sulpho group, compounds according to formula (I):

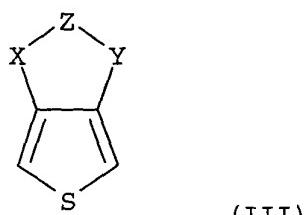


wherein R^1 and R^2 are independently H, -OH or alkyl, and n and m are independently 1, 2 or 3; compounds according to formula (II):



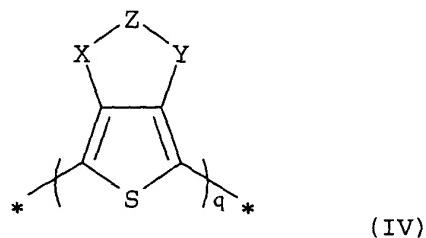
wherein p and q are independently 2, 3 or 4; compounds hydrolyzable to tetronic acid derivatives; compounds hydrolyzable to compounds according to formula (I); and sulpho-substituted 2-thia-alkyl-benzimidazole compounds.

20. 42. Electroluminescent device according to claim 41, wherein said optionally substituted 3,4-alkylenedioxythiophene structural units are represented by formula (III):



25 in which X and Y are O, Z is $-(\text{CH}_2)_m-\text{CR}^3\text{R}^4-(\text{CH}_2)_n-$; R^3 is hydrogen or $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; R^4 is $-(\text{CH}_2)_s-\text{O}-(\text{CH}_2)_p-\text{SO}_3^-\text{M}^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18.

30. 43. Electroluminescent device according to claim 41, wherein said polymer containing optionally substituted 3,4-alkylenedioxythiophene structural units is a polythiophene according to formula (IV)



in which X and Y are O; Z is $-(CH_2)_m-CR^3R^4-(CH_2)_n-$; R^3 is hydrogen or $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; R^4 is $-(CH_2)_s-O-(CH_2)_p-SO_3^-M^+$; M^+ is a cation; m and n are independently a whole number from 0 to 3; s is a whole number from 0 to 10; and p is a whole number from 1 to 18; and q is a whole number from 2 to 10,000.

- 5 44. Electroluminescent device according to claim 41, wherein said polymer containing optionally substituted 3,4-alkylenedioxy-thiophene structural units is poly[4-(2,3-dihydro-thieno[3,4-b][1,4]dioxin-2-ylmethoxy)-butane-1-sulphonic acid].
- 10 45. Electroluminescent device according to claim 41, wherein said polymer is selected from the group consisting of: poly(3,4-methylenedioxy-thiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxythiophene) derivatives, poly(3,4-propylenedioxy-thiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxy-thiophene) derivatives and copolymers therewith.
- 15 46. Electroluminescent device according to claim 41, wherein said polymer containing optionally substituted 3,4-alkylenedioxy-thiophene structural units is poly(3,4-ethylenedioxy-thiophene).
- 20 47. Electroluminescent device according to claim 41, wherein said layer further contains a polyanion.
- 25 48. Electroluminescent device according to claim 47, wherein said polyanion is poly(styrene sulphonate).
- 30